tone illustrations of the several cloud types, with names and descriptions and tables showing mean heights and velocities.

Through the zealous activity of one or more educational journals, the idea seems to have obtained that copies of these charts can be had for the asking. As a result the Bureau has been flooded with letters from children, apparently many of them yet in the primary grade, who ask for from one to ten copies each.

Although the chart was prepared primarily for the use of Weather Bureau observers, yet copies will be sent to such educators as desire them for school-room work, provided that their applications show that they are teachers of the proper grade. One or two copies should suffice for the use of a whole class, and it is not thought necessary to send them to young pupils, as such.

In general, the Weather Bureau publications are not really useful to teachers and scholars of schools below the grades of high schools, academies, and colleges.

THE WEATHER OF THE MONTH.

By ALFRED J. HENRY, Professor of Meteorology.

CHARACTERISTICS OF THE WEATHER FOR DECEMBER.

The month of December, 1900, was not marked by any severe cold waves or by unusually stormy weather. Mean pressure was in excess of the normal over the central Rocky Mountain and Plateau regions, and also in eastern Tennessee, Georgia, the Carolinas, and Virginia. There were no marked cold waves in the eastern part of the country. West of the Mississippi and north of the thirty-fifth parallel temperature was generally in excess of the normal for the season. Over this same region precipitation was markedly deficient, except on the immediate coast of Washington, where there was an excess of 3 to 5 inches. The month as a whole was drier than usual, except along the immediate Gulf coast and from southern Alabama northeastward to the Carolinas. The chief characteristics were, therefore, (1) high pressure over the central Rocky Mountain and Plateau regions, (2) drought on the Pacific coast south of Washington and a general deficiency of rainfall over the major portion of the country east of the Rocky Mountains, (3) high temperatures and a marked deficiency in snowfall throughout the entire Rocky Mountain and Plateau regions.

PRESSURE.

The distribution of monthly mean pressure is graphically shown on Chart IV, and the numerical values are given in Tables I and X.

The distribution of monthly mean pressure for the current month over the western third of the country is typical of that which obtains in winter under clear skies and in dry weather in California, Oregon, Nevada, Arizona, and Utah, and quite generally elsewhere throughout the northern and middle Plateau regions. It is also typical of the conditions which cause high winter temperature from the northern Plateau eastward over the northeastern Rocky Mountain slope and northward over the British Possessions.

It appears that there is a tendency on the part of the highs and lows, which approach the coast of the United States in the neighborhood of latitude 50° north, to cross the Rocky Mountains in higher latitudes some years than in others. The high temperature and deficient rainfall in California and elsewhere on the Pacific coast are due very largely to this shifting in latitude of storms which come from the Pacific.

TEMPERATURE OF THE AIR.

The distribution of monthly mean surface temperature, as deduced from the records of about 1,000 stations, is shown on Chart VI.

The month, as a whole, was warmer than usual, and this is especially true of the country west of the Mississippi River and north of the thirty-fifth parallel of latitude. Over this vast region temperature was uniformly above the seasonal average except in the Great Valley of California, where it was about 2° below the normal. Since the area of negative departures was exactly outlined by the contour of the valley it may be possible that the low temperature noted therein was simply the effect of air drainage on a large scale. The temperature of the air on all sides of the valley was above the normal.

The region of the greatest positive departure was in northern Montana and western North Dakota, where temperatures were from 8° to 10° above the seasonal average throughout the month. Maximum temperatures of 80° and upward were registered in southern Florida, in the Rio Grande Valley, southwestern Arizona, and southern California. The coldest part of the region of observation was in the Red River Valley of the North, when maximum temperatures of less than 40° were registered.

Freezing temperatures were experienced in central and southern Georgia, save on the immediate coast, in western Florida, and very close to the coast line in the State of Texas. The lowest temperatures of the month were recorded in northern Minnesota and in the mountain regions of Wyoming and Colorado.

The average temperature for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	10	30.2	− 0.2	+15.1	+ 1.3
Middle Atlantic	12	36.4	+ 0.1	+23.3	+ 1.9
South Atlantic	10	47.8	− 0.8	+11.8	+ 1.0
Florida Peninsula	7	61.6	+ 0.3	+ 1.2	+ 0.1
East Gulf	7	51.9	− 0.3	+ 4.6	+ 0.4
West Gulf	7	51.4	0.0	+13.9	+ 1.2
Ohio Valley and Tennessee	12	38.3	+ 0.1	+18.8	+ 1.6
Lower Lake	8	30 5	0 0	+17.8	+ 1.5
Upper Lake	9	26 0	+ 1.4	+24.6	+ 2.0
North Dakota	8	19.0	+ 5.1	+41.7	+ 3.5
Upper Mississippi Valley	11	29.9	+ 1.5	+25.6	+ 2.1
Missouri Valley	10	32.2	+ 3.6	+33.8	+ 2.8
Northern Slope	7	31.6	+ 6.7	+39.3	+ 3.3
Middle Slope	6	36.8	+ 1.9	+26.2	+ 2.2
Southern Slope	6	42.8	+ 1.0	+13.0	+ 1.1
Southern Plateau	15	40.7	+ 1.8	+ 9.0	+ 0.8
Middle Plateau	9	31.5	+ 3.6	+21.0	+ 1.8
Northern Plateau	10	30.2	+ 4.5	+24.8	+ 2.1
North Pacific	9	44.8	+ 3.0	+13.6	+ 1.1
Middle Pacific	5	49.0	+ 0.4	+ 8.7	+ 0.7
South Pacific	4	55.4	+ 2.7	+14.3	+ 1.2

In Canada.—Prof. R. F. Stupart says:

The mean temperature of December was considerably above average over the Dominion from Lake Superior westward to British Columbia. From Thunder Bay district to Manitoba the positive departure from average was 4° to 6°, and in western Assiniboia and in Alberta it ranged from 14° at Medicine Hat to 9° at Edmonton. In British Columbia it was as much as 10° on the Upper Mainland and but 5° on Vancouver Island.

Over the larger portion of Ontario the temperature was in excess of the average, 1° to 3°, but in the Ottawa Valley it was just average, and to the eastward of this there was a very general negative departure, ranging from 1° to 3°.

PRECIPITATION.

In but 4 of the 21 geographic districts into which the country has been divided was precipitation equal to or above the normal for the season. These districts were North Pacific coast, East Gulf, Florida Peninsula, and the South Atlantic States. In the remaining districts the precipitation averaged from 4 to as much as 72 per cent of the normal amount. But little rain fell in California, except in the northwestern portion of the State; little or no rain fell in Nevada, Utah, Arizona, New Mexico, Colorado, Wyoming, Montana, the Dakotas, Nebraska, Kansas, Oklahoma, and western Texas. The rainfall in the central valleys was likewise small in amount and not well distributed throughout the month. Reports from the climate and crop sections of the Rocky Mountain States show that there was a very general and marked deficiency in snowfall in these States, and that the amount of snow on the ground in the mountains is much less than for the corresponding month a year ago. The distribution of snowfall is shown by Chart VIII, and the amount on the ground at the end of the month by Chart IX.

HAIL.

The following are the dates on which hail fell in the respective States:

Arkansas, 2, 6, 7, 13, 22. California, 14. Georgia, 2. Kentucky, 7. Mississippi, 19, 22. Missouri, 22, 27. New Mexico, 11. Oklahoma, 19. Oregon, 15, 16, 17, 19, 20, 21, 27, 28, 29, 30, 31. Tennessee, 22. Washington, 16.

SLEET.

The following are the dates on which sleet fell in the respective States:

Arizona, 31. Arkansas, 29, 30. California, 9, 14, 20, 21. Colorado, 22. Connecticut, 6. Delaware, 21, 25. Illinois, 3, 4, 6, 16, 22, 23, 25, 26, 27, 28, 29, 30, 31. Indiana, 4, 5, 14, 18, 24, 27, 30. Indian Territory, 29. Iowa, 3, 6, 16, 22. Kansas, 15, 27, 30. Maryland, 9, 18, 21, 25, 28, 30, 31. Michigan, 4, 5, 18, 23. Minnesota, 16, 17, 22, 23. Missouri, 3, 4, 16, 22, 23, 27, 29, 30. Montana, 12, 18, 25, 30. Nebraska, 3, 5, 7, 14, 15, 16, 22, 23, 27. Nevada, 14. New Hampshire, 4. New Jersey, 21, 28. New Mexico, 29. New York, 4, 5, 7, 9, 13, 23, 26, 27, 30, 31. North Carolina, 3, 4, 21, 26. North Dakota, 1, 3, 22. Ohio, 1, 3, 4, 7, 8, 15, 17, 30. Oklahoma, 31. Oregon, 16, 17, 25, 29, 30. Pennsylvania, 9, 28, 30, 31. South Dakota, 3, 6, 7. Texas, 28, 29, 31. Utah, 9, 20, 21, 26. Vermont, 2, 4, 5 Virginia, 17, 18, 20, 21, 29. Washington, 11, 15, 16, 29. West Virginia, 17, 18, 28, 30. Wisconsin, 2, 4, 5, 6, 17, 23, 24. Wyoming, 9, 10, 20, 21, 26.

In Canada.—Professor Stupart says:

There was a pronounced deficiency of precipitation in nearly all parts of the Dominion; in both Ontario and Quebec the combined snowfall and rainfall was in many districts less than half the average, and at most points near Lakes Erie and Ontario it was scarcely more than quarter the average amount.

In the Maritime Provinces and British Columbia precipitation was also deficient to a marked degree. Reports from Manitoba and the Territories seem to indicate a nearly average snowfall in Manitoba and Assiniboia and a somewhat heavier fall than usual in Saskatchewan.

At the close of the month the ground in all the more southern and western parts of both Ontario and Nova Scotia was either entirely bare of snow or there were but a few patches here and there; all lower levels in British Columbia were also bare.

In Saskatchewan, northern Manitoba, northern Ontario, throughout the Province of Quebec, and in the interior of New Brunswick the covering is very generally over 10 inches, and in many localities it is nearly 20 inches. Over the more southern portions of New Brunswick and in Prince Edward Island and also in southern Manitoba and southern portions of the Northwest Territories there is just about enough snow for sleighing.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	10	2.18	61	—1.4	— 3.6
Middle Atlantic	12	2.35	72	—0.9	— 8.4
South Atlantic	10	4.59	128	+1.0	— 6.4
Florida Peninsula	7	3.77	147	+1.2	+ 2.5
East Gulf	7	5.44	125	+1.1	+10.3
West Gulf	7	2.29	70	—1.0	+ 1.3
Ohio Valley and Tennessee	12	1.93	55	—1.6	— 7.5
Lower Lake	8	1.46	51	—1.4	— 2.5
Upper Lake	9	0.84	38	—1.4	— 3.7
North Dakota	8	0.24	44	—0.3	+ 2.0
Upper Mississippi Valley	11	0.54	28	—1.4	— 0.5
Missouri Valley	10	0.30	27	—0.8	+ 1.8
Northern Slope	7	0.32	62	—0.2	— 1.5
Middle Slope	6	0.59	60	—0.4	+ 0.8
Southern Slope	6	0.43	30	—1.0	+ 7.8
Southern Plateau	15	0.05	4	—1.3	— 1.6
Middle Plateau	9	0.26	18	—1.2	— 3.9
Northern Plateau	10	1.27	72	—1.5	— 2.0
North Pacific	9	10.41	117	+1.5	— 0.1
Middle Pacific	5	2.40	43	—3.2	— 4.4
South Pacific	4	0.15	5	—2.9	— 3.4

SUNSHINE AND CLOUDINESS.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

The averages for the various districts, with departures from the normal, are shown in the table below:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.7	—0.1	Missouri Valley	5.2	+0.1
Middle Atlantic	5.5	+0.1	Northern Slope	4.8	+0.2
South Atlantic	5.1	+0.4	Middle Slope	4.1	+0.1
Florida Peninsula	6.3	+1.7	Southern Slope	2.6	—1.8
East Gulf	5.6	+0.4	Southern Plateau	1.6	—1.4
West Gulf	4.9	—0.4	Middle Plateau	4.4	—0.7
Ohio Valley and Tennessee	5.9	—0.2	Northern Plateau	7.6	+0.5
Lower Lake	8.0	+0.4	North Pacific Coast	7.7	+0.4
Upper Lake	7.6	+0.5	Middle Pacific Coast	5.7	+0.3
North Dakota	5.1	—0.1	South Pacific Coast	3.8	—0.6
Upper Mississippi	5.6	—0.1			

HUMIDITY.

The averages by districts appear in the subjoined table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	76	+ 1	Missouri Valley	74	— 1
Middle Atlantic	75	+ 1	Northern Slope	69	+ 2
South Atlantic	78	— 1	Middle Slope	63	— 2
Florida Peninsula	83	+ 1	Southern Slope	54	—13
East Gulf	76	— 2	Southern Plateau	39	— 9
West Gulf	76	+ 3	Middle Plateau	63	+ 4
Ohio Valley and Tennessee	76	+ 1	Northern Plateau	83	+ 2
Lower Lake	76	— 2	North Pacific Coast	87	— 1
Upper Lake	84	+ 3	Middle Pacific Coast	80	— 4
North Dakota	81	+ 2	South Pacific Coast	66	— 8
Upper Mississippi	80	+ 4			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Baker City, Oreg	21	50	sw.	Helena, Mont	13	52	sw.
Block Island, R. I	4	84	e.	Mount Tamalpais, Cal.	21	55	nw.
Do	5	60	w.	Do	27	55	nw.
Do	9	55	nw.	Nantucket, Mass	4	60	e.
Boston, Mass	5	60	e.	Do	5	61	w.
Buffalo, N. Y	8	64	sw.	New York, N. Y	4	72	e.
Do	9	67	w.	Do	5	60	nw.
Do	13	59	w.	Do	9	60	nw.
Do	24	52	sw.	Do	13	54	nw.
Carson City, Nev	14	50	sw.	Point Reyes Light, Cal.	29	54	nw.
Do	16	59	sw.	Portland, Me	4	54	ne.
Chicago, Ill	23	52	sw.	Do	5	51	ne.
Eastport, Me	4	52	e.	Winnemucca, Nev	14	58	sw.
Do	5	62	ne.				

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table VII, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—Reports of 261 thunderstorms were received during the current month as against 167 in 1899 and 976 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 22d, 51; 23d, 44; 27th, 28.

Reports were most numerous from: Arkansas, California, Illinois, and Missouri, 24; Georgia and Oregon, 23.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, 2d to 10th.

In Canada.—An aurora was reported at Calgary and Prince Albert on the 27th.

DESCRIPTION OF TABLES AND CHARTS.

By ALFRED J. HENRY, Professor of Meteorology.

For description of tables and charts see page 453 of REVIEW for October, 1900.